

CLAIMS

1. A surface modification method comprising  
bringing, into a high-temperature flame  
formed by use of a combustible gas and a combustion-  
supporting gas,

inorganic oxide powder A having an average  
particle size falling within a range of 0.5 to 200  $\mu\text{m}$  as  
measured by means of laser diffraction/scattering  
particle size analysis and

inorganic oxide powder B having a particle  
size calculated on the basis of its BET specific surface  
area (hereinafter may be referred to simply as "BET-based  
particle size") of 100 nm or less,

to thereby modify the surfaces of  
particles of the powder A by means of particles of the  
powder B.

2. A surface modification method comprising  
bringing, into a high-temperature flame  
formed by use of a combustible gas and a combustion-  
supporting gas, inorganic oxide powder A having an  
average particle size falling within a range of 0.5 to  
200  $\mu\text{m}$  as measured by means of laser  
diffraction/scattering particle size analysis; and

bringing again the resultant powder into a  
high-temperature flame formed by use of a combustible gas  
and a combustion-supporting gas,

to thereby modify the surfaces of  
particles of powder A.

3. The surface modification method according to  
claim 1 or 2, wherein the combustible gas is any species  
selected from among methane, ethane, propane, ethylene,  
propylene, acetylene, butane, LPG, hydrogen, and carbon  
monoxide; or a gas mixture thereof.

4. The surface modification method according to  
any one of claims 1 through 3, wherein the high-  
temperature flame is formed by a coaxial triple-tube

burner having an innermost tube, an intermediate tube and an outermost tube, in which the powder or powders are passed through the innermost tube, a combustible gas is passed through the intermediate tube and a combustion-supporting gas is passed through the outermost tube.

5           5. The surface modification method according to any one of claims 1 through 4, wherein powder A and powder B are sprayed into the flame together, optionally with a carrier gas.

10           6. The surface modification method according to any one of claims 1 through 5, wherein powder A comprises particles of an oxide of Al, Mg, Ca, Ti, or Si, or particles of a mixed crystal of such oxides.

15           7. The surface modification method according to any one of claims 1 through 6, wherein powder B comprises particles of an oxide of Al, Ti, or Si, or particles of a mixed crystal of such oxides.

20           8. The surface modification method according to claim 6 or 7, wherein powder A comprises particles having a spherical degree of at least 0.7 as defined by the following formula [1]:

25           spherical degree = (the circumference of a circle having the same area as that of a projection image of a particle)/(the length of the contour of the projection image of the particle) . . . . . [1].

30           9. The surface modification method according to any one of claims 6 through 8, wherein the BET-based particle size of powder B is 1/10 or less the average particle size of powder A as measured by means of laser diffraction/scattering particle size analysis.

          10. The surface modification method according to any one of claims 6 through 9, wherein the amount of powder A is 50 mass% to 99 mass% inclusive on the basis of the total mass of powder A and powder B.

35           11. A powder obtained through a surface modification method as recited in any one of claims 6 through 10, which has an average particle size of 0.5  $\mu\text{m}$

to 250  $\mu\text{m}$  as measured by means of laser diffraction/scattering particle size analysis.

12. The powder according to claim 11, which comprises particles having a spherical degree of at least 0.7 as defined by formula [1] described in claim 8.

13. The powder according to claim 11 or 12, which has undergone surface treatment by use of an agent for imparting hydrophobicity to the surface of the powder.

14. An organic polymer composition characterized by comprising an organic polymer and the powder as recited in any one of claims 11 through 13 in an amount of 0.01 mass% to 90 mass% on the basis of the entire mass of the composition.

15. A silicon-containing polymer composition characterized by comprising a silicon-containing polymer and the powder as recited in any one of claims 11 through 13 in an amount of 0.01 mass% to 90 mass% on the basis of the entire mass of the composition.

16. An organic polymer composition according to claim 14, wherein the organic polymer of the composition is at least one resin selected from the group consisting of a synthetic thermoplastic resin, a synthetic thermosetting resin, and a natural resin.

17. The organic polymer composition or silicon-containing polymer composition according to any one of claims 14 through 16, which is in the form of a compound.

18. The organic polymer composition or silicon-containing polymer composition according to any one of claims 14 through 16, which is in the form of a masterbatch.

19. A molded product characterized by being formed through molding of the organic polymer composition or silicon-containing polymer composition as recited in any one of claims 14 through 18.

20. A slurry characterized by comprising the powder as recited in any one of claims 11 through 13.

21. A coating agent characterized by comprising the

powder as recited in any one of claims 11 through 13.

22. A coating material characterized by comprising the powder as recited in any one of claims 11 through 13.

23. A structure characterized by comprising, on its surface, the powder as recited in any one of claims 11 through 13.

24. The structure according to claim 23, wherein said structure is one selected from the group consisting of building materials, machinery, vehicles, glass products, electric appliances, agricultural materials, electronic apparatus, tools, tableware, bath products, toiletry products, furniture, clothing, cloth products, fibers, leather products, paper products, sporting goods, futon, containers, eyeglasses, signboards, piping, wiring, brackets, sanitary materials, automobile parts, outdoor goods, stockings, socks, gloves, and masks.

25. A luminescent material comprising the powder as recited in any one of claims 11 through 13.

26. A cosmetic composition comprising the powder as recited in any one of claims 11 through 13.

27. The cosmetic composition according to claim 26, further comprising at least one selected from the group consisting of an oil, a whitening agent, a humectant, an anti-aging agent, an emollient, an extract, an anti-inflammatory agent, an antioxidant, a surfactant, a chelating agent, an antibacterial agent, a preservative, an amino acid, a sugar, an organic acid, an alcohol, an ester, fat and oil, a hydrocarbon, an anti-UV agent, and an inorganic powder.

28. A method for producing a powder, which comprises a method as recited in any one of claims 1 through 9.